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Role of ICT in the Educational Upliftment of Women – Indian Scenario

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Abstract— The paper discusses the significance of Information and Communication Technologies in the Educational sector. With the emergence of ICT's, there has been a rapid change in the way information is exchanged and how people communicate. There has been lot of innovative tools and ways of gathering and sharing information that would have been seem impossible few years back. Digital literacy has become a key 21st century skill. What countries should do is to prepare the students of this generation to cope up with the demands of the new digital age where there is a growing dependency on digital content instead of paper-based content through providing facilities in terms of infrastructure and opportunities to learn through ICT. The paper throws light on the challenges in effective use of ICT by students in India based on an Action Research project. The paper predominantly contributes on the socio-cultural factors that should be given significance in designing technology for making the ICT widely acceptable from a gender perspective.

Keywords - ICT; education; gender; internet; action research

I. INTRODUCTION

Knowledge is very important for the development of a society and its people. The fact that knowledge plays a significant role in empowering people to achieve the sustainable development has been long recognized in India (Singh, 2005)[1]. How a community succeeds in coping up with today's knowledge economy depends on to large extent on how it embraces the information and communication technologies (McKeown, Noce & Czerny, 2007)[2]. While many debate over the use of ICT for development in terms of, weather importance should be given to providing the basic amenities than ICT resources for the needy and poor. The ones that defend role of ICT for the development of a nation argue that we cannot ignore the role of ICT since its significance lies not only on the easier exchange of information and communication but the growth and development it brings to the society through knowledge sharing which is a crucial component for the development of a society. Technology as such is not the answer for the social problems in a society. However, the availability and use of technology can bring tremendous improvement in the functioning and over all development of a society. The potential to exploits the benefits of ICTs largely depends on the access and adoption of these technologies, which can play a pivotal role in the social and economic development of a community.

II. INTERNET – THE INEVITABLE ICT TOOL FOR EDUCATION

The Educational sector has been strongly influenced by the usage of Internet. The word literacy itself needs to be reconsidered with ability to read and write being given a new connotation. Today the word requires an updated focus that embraces the latest abilities and competencies required in order to manage digital information in the new Social Networking context (Dirckinck-Holmfeld, V. Hodgson, D. McConnell, in press)[3]. Just as essential requirement of a life long learner being the ability to access, evaluate and use information, how to retrieve and use information from the internet is a must for the learners of this generation. However, it is not primarily technical skills that make an effective Internet user, but rather the reflective and conceptual capabilities that are part of the character of the information literate. (Edwards, Bruce, 2002)[4]. In today's times, to become a competent learner requires knowledge and skills to use the new emerging technologies that make learning more challenging than it was years back. Internet is being viewed as a "virtual laboratory" with its ability to bring people together in a virtual space, its usage as a communication medium and the capacity to collect enormous amounts of data. (Sklar & Pollack, 2000)[5]. There is abundance of information available through Internet. However, to access and use the correct information is challenging. The ability to access and use the required and appropriate information from the Internet is very crucial for the students of this generation. After a decade print sales will diminish sharply as electronic publishing initiatives such as blogs, RSS, integrated media players, pod casting and publishing-on-demand devices become integral part of the digital age. (Secker & Lingard, 2010)[6]. Another significant factor that makes Internet inevitable in the educational system is the fact that becoming skillful in using the Internet will make the students prepared to cater to the needs of the future job market. The latest 21st century ICT's are more complex than simple computerized tasks and the future job market may demand people who are highly skilled and experts in using the latest ICTS's. Studies shows that use of ICT's in education have a positive impact on the learning skills of the students and will enable to develop the critical thinking skills. A study done by Center for Applied Special Technology (CAST) to find out the effect of Internet

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on performance of student projects between students who accessed Internet and those who did not, it was found out that the students with online access performed well. And the online student users received significantly higher scores relative to presenting their work, stating a civil rights issue, presenting a full picture (who, what, when, where, why, how), bringing together different points of view and producing a complete project (CAST, Table 2) (as quoted in Cradler, McNabb, Freeman & Burchett 2002)[7]. At the University of Pablo de Olavide, in Spain, freshers from the Humanities discipline were given training in computer literacy and competencies. A wiki was created and used for sharing ideas and materials with the students. Students were asked to write their essays on the Wiki and share their knowledge with other students. Twitter accounts were used for the students to communicate with the teachers. Students felt that the training was very much going to benefit rest of their academic life (Gonza´lez &Villavicencio, 2010)[8]

III. GENDER CONTEXT & ICT

ICT‘s should be designed based on the context into which it is introduced since use of technology is not culturally neutral (McIssac & Gunawardena,1996)[9]. Technology affects the lives of people across the world in different ways. Social divisions that exist with in any society like gender, class, age, ethnicity and race will be affected differently by any technology introduced. This also makes a difference in how people will differ in their skills to use the technology and will value the technology differently. Montgomery (2002) (as quoted in Huyer & Sikoska, 2003) [10]advocates that “technology projects should be seen as a component of the social context in which it is placed and not the other way around”. According to Gajala (2002)[11], a gendered understanding of ICT and technological environments is necessary because gender is a significant factor of the social context and its structures. Even though there are no cognitive differences between a boy and a girl, gender stereotypes are very much permeated in the society (Johnson, 2010) [12]. Studies show that girls have less ICT skills and knowledge compared to boys (Volman & Van Eck 2001)[13]. Majority of women in developing countries are not getting advantage of the information economy. Women, especially those living in rural areas, are still excluded from accessing the Internet or do not have the skills to use it in a profitable way (UN 2005)[14]. Taking the case of India out of the 52 million active Internet users, working women constituted only 4.2 million and non-working women constituted 3.6 million users (Icube, 2010)[15]. These discrepancies in access and use of ICT by women and men are called the gender digital divide. Even though girls from better economic backgrounds get the opportunity and enjoy the advantages of the new digital economy, it is not the same with girls coming from weaker economic backgrounds.

IV. CHALLENGES FOR THE EFFECTIVE USE OF ICT BY STUDENTS IN INDIA – A GENDER PERSPECTIVE

India is a country with a vast knowledge economy. India has actively used ICT in the development of its formal and informal educational sector. Government of India has recognized that emphasis should be given to area of ICT that can boost the capacity building efforts of educational institutions in the country. To fully utilize the potentials of ICT as a tool in education and to bring down the digital divide Government of India has made a budget allocation of 102 million US$ in 2008-09 for the National Mission on Education through ICT. (Mission Document, 2009)[16]. The mission aims at an appropriate balance between content generation, research in critical areas relating to imparting of education and connectivity for integrating knowledge with the advancements in other countries. However, all these efforts cannot be fruitful unless and until the barriers that restrict the effective use of ICT in the educational sector in India is removed. India still needs further steps to make ICT an essential component in teaching and learning initiatives. Though ICTs brings major opportunities it is quiet challenging too. Some of the core areas which has to looked into from a gender perspective are:

A. Infrastructral Barriers

One of the main challenges is to put the proper infrastructure in place. Powerful broadband networks are crucial for the getting an edge in the knowledge economy and countries should give significance and consider broadband networks as part of basic infrastructure (GIT report, 2011)[17]. India has difficulty in providing adequate infrastructural resources to the educational institutions. It is difficult to imagine schools and higher education institutions not having some form of access to Internet to support learning. One of the key issues that keep the female students away from ICT is lack of proper infrastructural facilities in their respective educational institutions that makes them depend on public sources to access ICT. Therefore, the Government through educational institutions has a major role in providing the infrastructure and providing ICT technologies to schools, universities and colleges.

B. Poor Understanding of the Students Background

How students can be motivated to use the Internet is a significant issue. Empirical studies shows that socio cultural factors do influence the usage levels of Internet by the people (Hargittai, 2004)[18]. A study based on a survey of 1024 young people in Germany (aged between 14 and 23 years) show that even among young users, who are supposedly the ‘Internet-savvy’ generation, there is a strong relationship between social inequality and differences in Internet usage (Iske, Klein, Kutscher, Uwe Otto, 2008) [19]. A thorough understanding of the students’ background is very essential before designing the learning process and setting up the infrastructure. From a gender perspective,

what have to be looked into are the issues which female students face in using the ICT like technophobia, issues of mobility when they have to use the public sources, financial constraints etc. Instead of giving uniform instruction, there should be some customization, which can deepen the students' engagement with using ICT's and to keep them motivated.

C. Cultural Prejudice

For most of the female students who are coming from economical weaker backgrounds, the easiest and most available point of Internet access are Internet cafes. Internet cafes can be considered as the libraries of future where people can go and be connected to the Internet for a minimal fee (Collins & Halverson, 2010) [20]. There is no dearth of Internet cafes in India. However, the problem is that in a country like India, in remote villages and small towns it is not culturally appropriate for women and girls to visit the Internet cafes at odd times of the hour. Internet centers are not considered appropriate places to hang out for girls and even if they go, they prefer to be accompanied by someone (Johnson, 2010)[12]. Awareness workshops and training can be given to female students to demystify their fear.

D. Lack of Motivated & Trained Faculty

Just the availability of computer and Internet in classrooms and making the class connected to the Internet world is not enough. They have to be trained on how to use the Internet to exploit the new age technologies (Kumari, 1998) [21]. The problem lies when the teachers themselves are not confident that the students will find learning through Internet medium acceptable, which makes them hesitant to experiment with Internet learning. Unless the teachers and students realize the value of Internet learning, the full potential will not be able to be utilized (Lee, Cheung, Chen, 2005) [22]. Special care should be taken to students who are girls as they do not have the options like boys to go and access Internet from public places as and when they want to. Teachers have a big role to play by rethinking the ways of inculcating learning through the use of Internet by the female students.

E. Localisation Of ICT

The methods and style of teaching and learning vary from country to country. Socio – Cultural factors often have a tremendous impact on the teaching and learning styles. However, technology can play a major role in transforming the teaching and learning irrespective of the country into which it is introduced. Instead of copying ICT integration projects to education that is successful in the west, importance should be given to understand and study the implications of how it can get the expected outcomes in countries that are beginning to adopt or who are late adopters of ICT. Most of the successful projects in developed nations are based on the assumption that students have one to one PC and uninterrupted Internet access. There should be consideration given even to the physical environments in institutions where the ICT's are established. Educational institutions should adopt a holistic approach in designing the learning environments where there is an integration of ICT, management and design (Zandvliet & Fraser, 2004) [23]. From a gender perspective, the role and position of women in the society where they belong to should be thoroughly investigated. Observations should be made on the technological perceptions that the women have. In some societies, women may consider technology as a significant factor for development but for some women it may not add any value.

V. Designing of Internet Training for Female Students with Limited Access

The surging Internet usage by individuals demands the research and development community to work in human-computer interaction and information retrieval (Marchionini, 2006)[24]. The research on "Student Empowerment through Internet usage" stems from such a thought process on what happens when a female students of this generation who have limited access to technology, comes face to face with technology. Searching the web and getting adequate and correct information is a complex process, which require great amount of specialized searching skills. Learning how to use Internet is not an easy task because of the diverse paths of navigation and usage options. (Iske, Klein, Kutscher, Uwe Otto, 2008)[19].

A. Ethnographic Action Research

The study was done at the University Of Calicut's Department of women's studies in India. The focus group was thirteen master's students who were born between 1988 -1990. The University followed a traditional classroom teaching methodology. The Department had two PC's with Internet connection but the curriculum did not have any learning activities that demanded student's engagement with the ICT environments. Therefore, the students were not using Internet for any of their academic activities. The goal of the project was to train the students with required skills on using the Internet to search, evaluate and use information. These life-long skills, which they were going to gain, will help them in not only their educational and academic activities but also enable them to be informed and make effective choices and decisions on other life's endeavors. The main reason for using an ethnographic action research approach was that ethnographic approach ensures that research is focused on how problems and opportunities are defined by people locally and allows research methods and the project itself to be creatively adapted to the local situation. (Tacchi, Slater, Hearn, 2003) [25]. The ethnographic approach guarantees that the research is carried on within a wider and deeper understanding of local settings and needs. Since the aim of the project was to enable the students to use the Internet with no prior knowledge, the project demanded great

amount of flexibility. Since Action research is conducted to understand and change the situations, it provided the flexibility required by its action orientation to respond to the evolving phases of the research situation (Dick, 2007)[26].

B. *Future Workshop*

Future Workshop was conducted with the aim of finding out from the students themselves about the problems that they face in using the Internet and to make them generate a vision about the preferred situations and to bring out ways of achieving those preferred situations. Future workshop as stated by Apel (2004) [27] is a technique to reflect on a common problematic situation, to generate visions about the future and to discuss how these visions can be realized. Students came out with the main problems that restricted their use of Internet through a visual brainstorming. The problems were clustered to bring out major themes. Themes identified were low internet speed, high cost, ignorance, fear of using internet, lack of time, gender roles, restricted cccess and the educational system not encouraging enough to use the Internet. Since it is not possible to work on all the topics generated from the brainstorming, ideas should be prioritized (Vidal, 2006)[28]. Among the most number of problems that were listed like speed, cost, ignorance and fear, weightage was given in terms of their implementation possibilities. The most feasible problems that could be worked on were to reduce the fear and ignorance.

C. *Internet Training based on Blooms digital Taxonomy of learning domains*

Blooms Digital taxonomy developed by (Churches 2009) [29]focuses on the actions and learning behaviors in the new digital age. The Taxonomy is not about the tools and technologies instead its focuses on how to use these tools and technologies to achieve, recall, understanding, application, analysis, evaluation and creativity. Figure 1 shows the Internet training activities based on learning domains and the corresponding activities selected for learning

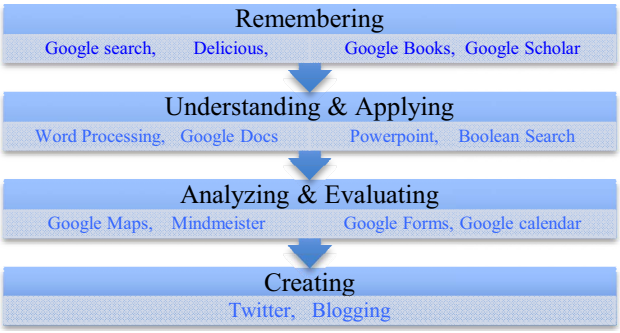

Figure 1 Design of Internet Training

D. *Action Research Workshops*

In the AR workshops, students were give activities to work on the Internet. These activities were based on what they learnt in the preceding Internet training sessions. Students executed the Internet searching using the action research model for reflective Internet searching (Edwards & Bruce, 2002) [4]. It facilitated the students to learn how to search Internet using the action research cycle of planning, acting, recording and reflecting. Students discussed the problems that they faced in getting correct information and those who got the right information discussed how they got it. Students explained how they did the web search.

Figure 2 show's the model that supported the students to search the Internet and reflect on the process of Internet search techniques and the results and learn from each other in the group.

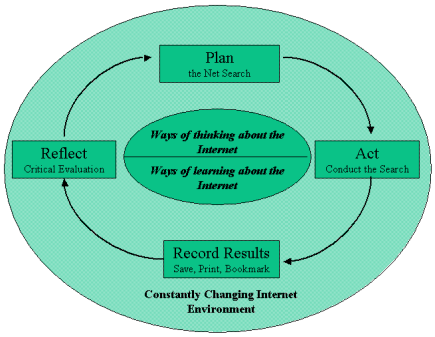

Figure 2 Action Research Model for Reflective Internet Searching (Edwards, Bruce, 2002)

E. *Measuring the Success of the project*

The empowerment analytic framework developed by (Alsop & Heinsohn, 2005)[30] forms the basis for measuring the empowerment processes and outcomes in the research. Alsop and Heinsohn state that capacity to make an effective choice is primarily influenced by two sets of factors: agency and opportunity structure. Agency is defined as an actor's ability to make meaningful choices; that is, the actor is able to envisage options and make a choice. Opportunity structure is defined as the formal and informal contexts within which actors operate. The factors together give rise to different degrees of empowerment. To measure Agency—the capacity to make meaningful choice, in the framework, Asset endowments are used as indicators of agency. What agency means for the students in the research is, to make a choice to use the Internet. The empowerment indicators for measuring the psychological endowments were fear and confidence. Empowerment Indicator for measuring the Informational endowment is Ignorance. To be

empowered was through gaining knowledge to use the Internet, to acquire reflective skills to search, evaluate, and use the information. Students shied away from using the Internet predominantly because of fear of using the Internet and lack of knowledge on how to use the Internet. If they are primed, with the knowledge on how to use the Internet it will automatically bring down the fear of using it and thereby making them more confident. Multiple methods were used for collecting data like students reflections, measurement check through questionnaire based on the psychological endowment variables and participant produced drawings. Informational endowments were relatively easier to measure because it was about measuring the knowledge and skills gained. The methods used to measure this element of agency were measuring the Knowledge level before and after the workshops, Objective Test and Action Research Workshops.

Table 1 below represents the number of students who have used and had knowledge in the respective tool before the training and Action Research Workshops and also gives a picture of how the students have changed after the training and workshops. The response group was eight female students. Most of the students have not heard of the tools that they were introduced to. The number of students who thought they were experts in using the tools was very few. It was not expected that they would become experts in searching but that they do improve in Internet usage skills and gain confidence in using the Internet. The most important parameter was that was looked into was "No change". Only two students responded that their knowledge has not changed much after the interventions in the form of Internet training and workshops.

Table 1 Usage & Knowledge Level Before The Workshops

Tools	**Usage & Knowledge Level Before The Workshops**				**Usage & Knowledge Level After The Workshops**		
	Haven't heard before	Have heard, but didn't know how to use	Have used	Was an expert	No change	Some Improvement	Lot of Improvement
Google Search		4	4			2	6
Boolean Search	6	1	1			6	2
Google Books	4	3	1			7	1
Google Scholar	5	3				4	4
Email ID		5	2	1		2	6
Delicious	7	1			1	4	3
MS Word		3	3	2	1	1	6
Google Docs	6	2				4	4
MS PowerPoint		2	5	1		2	6
Google Maps	6	1	1			2	6
Mindmeister	8					4	4
Google Forms	8					3	5
Google calendar	6	2				7	1
Twitter	4	4				1	7
Blogs	2	6				2	6

VI. CONCLUSION

Students around the world are taking learning out of schools and colleges into homes and libraries. This gives them the freedom to decide where they want to learn, when they want to learn and how they want to learn. It is extremely important that educational institutions in India should gear up to provide all possible opportunities for students to learn the new technologies and match up with the rapidly growing knowledge economy. It is also important to remember that adopting the new ICT's are in no way challenging to the basic educational theories, concepts and values (Dirckinck-Holmfeld, Hodgson, McConnell, in press) [3]. If the educational institutions in the country does not adapt and embrace technology driven learning for the current and coming generations, students will be far behind from their counterparts in countries who have already adopted and integrated ICT to their educational field. This research, with focus on female students reinstates the fact that just easy access does not bring the female students closer to ICT.

They should have the knowhow and sufficient confidence to use the accessible technology. Instead of basic assumptions, effort should be done to understand what are the underlying problems that make female student learners of this generation stay away from ICT even though there are options for easy access. An insight on the gendered nature of the social, economic, policy and technology systems, which frame opportunities for women in the society that they represent, is very vital (Huyer, 1997)[31]. This will enable designers of technology to recognize the importance of how gender perceptions influence technology designs and the how the environments in which these technologies are positioned determine the way women and men access and use technology differently.

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